Reconsideration of the above-identified application is respectfully requested in view of the following amendments and remarks.

REMARKS

Status of the Claims

Claims 1-16 have been canceled. Claims 17-30 are pending.

Claims 17-30 have been rejected.

Claim 30 has been amended.

Restriction Requirement

Applicant hereby confirms the prior election of claims 17-30 made by Raymond Keller on January 2, 2007. Accordingly, claims 1-16 have been cancelled herein. Applicant reserves the right to file a divisional on any non-elected invention.

Objection to the Specification

The Examiner has objected to the abstract because the elected claims are directed to the method of reducing NOx and the abstract is directed to the composition for removal of NOx. See Office Action at page 3, section 2.

Applicant has amended the abstract. As amended, the abstract is directed to the method of reducing NOx, as suggested by the Examiner. As such, this objection has been rendered moot.

Objection to the Claims

The Examiner has objected to claim 30, stating that claim 30 should read, "The method of claim 23 wherein..." See Office Action at page 4, section 3.

Applicant has amended claim 30, as suggested by the Examiner. As such, this objection has been rendered moot.

Rejections under 35 U.S.C. § 103

The Examiner has rejected claims 17-30 under 35 U.S.C. §103(a) as being unpatentable over Peters et al. (U.S. Pat. No. 6,379,536) in view of Aubert et al. (U.S. Pat. No. 6,214,06). Applicant respectfully traverses this rejection.

The presently claimed invention is directed to, "A method of reducing NOx emission during fluid catalytic cracking of a hydrocarbon feedstock... comprising contacting a hydrocarbon feedstock with a cracking catalyst suitable... in the presence of a NOx reduction composition, wherein said NO_x reduction composition comprises a (i) mixed oxide of cerium and zirconium, ..., said NO_x reduction component being present in a sufficient NOx reducing amount." See Claim 17 (emphasis added). As the Examiner points out, Peters et al. discloses a process for NOx control in an FCC process. See Office Action at page 5, section 8. However, Peters et al. does not disclose the use of a "mixed oxide of cerium and zirconium" as a NOx reduction composition. The Examiner has acknowledged this fact. See Office Action at page 5, section 8.

The Examiner cites Aubert et al. to overcome this deficiency. As the Examiner points out, the Aubert invention "discloses a composition based on zirconium and cerium oxides." See Office Action at page 6, first paragraph. However, there is no indication whatsoever in Aubert et al. that the zirconium and cerium oxide can be used as a NOx reduction component in combination with an FCC catalyst. Nevertheless, according to the Examiner, Aubert et al. "discloses that the composition of the invention can be used in the catalyst of various reactions such as

hydrodenitrification, cracking, hydrocracking etc." See Office Action at page 6, second paragraph; see also, Aubert et al. at col. 7, lines 50-60. Even though Aubert et al. briefly discloses uses such as hydrodenitrification, cracking, hydrocracking, there is no mention of NOx reduction or even the potential need to reduce NOx gases. Applicant does not believe that the broad disclosure of hydrodenitrification is directed to a NOx reduction component.

Furthermore, catalyst art is empirical. As one of skill in the art would appreciate there is simply no way of knowing how an additional component to the catalyst composition would affect the catalytic activity thereof. As such, Applicant respectfully asserts that there is no motivation to combine the mixed oxide of cerium and zirconium taught in Abert et al., with a process for NOx control in an FCC process, as disclosed in Peters et al. Furthermore, there is no indication that if such a combination were made that it would work for the intended purpose. According to the M.P.E.P., "to establish a *prima facie* case of obviousness... there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings [and] there must be a reasonable expectation of success." See M.P.E.P. §2143, Eighth Edition, Rev. Aug. 2006 at page 2100-126. Again, nowhere in Aubert et al. is the use of the mixed oxide of cerium and zirconium disclosed as a NOx reduction component in combination with an FCC catalyst. Therefore, it is Applicant's position that one of skill in the art would not be motivated to combine the mixed oxide of cerium and zirconium of Aubert et al. with the FCC catalyst of Peters et al., or reasonably expect such a combination to work for the intended purpose, NOx reduction in an FCC process, without direction from Applicant's disclosure.

Applicant respectfully directs the Examiner's attention to the Examples of Applicant's disclosure, which shows improved NOx reduction with a mixed oxide of cerium and zirconium over both ceria and zirconia alone. See Examples 1-7 and Examples A and B at pages 9-11, of Applicant's specification. According to the specification, Table 1 of Applicant's disclosure shows that, "Examples 1 and 4 through 7, within the scope of the present invention, yielded substantial NO uptake retention and surface area stability relative to Comparative Examples A and B." See Applicant's specification at page 11. Since Aubert et al. does not disclose NOx reduction in an FCC process using zirconium and cerium, and since zirconium and cerium by themselves show no NOx reduction, absent Applicant's disclosure there would be no reason to expect success using the claimed combination for NOx reduction.

As such, Applicant respectfully asserts that the combination of Peters et al. with Aubert et al. does not and cannot render the claim 17 obvious. Applicant notes that the Examiner has commented on each of the dependent claims. Applicants wish to thank the Examiner for his thorough review. However, in as much as claims 18-30 depend directly or indirectly from claim 17, Applicant asserts that claims 18-30 are likewise not obvious over the combination of Peters et al. and Aubert et al.

Reconsideration and withdrawal of this rejection is respectfully requested.

Double Patenting

The Examiner has rejected claim 17-30 on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Pat. No. 6,852,298. Applicant traverses this rejection.

The Examiner concludes, "[s]ince the support material does not play an active role in the NOx reduction, it would have been obvious to one skilled in the art at the time the invention was made to modify the '298 claims to eliminate the acidic support and include zirconium with cerium for an enhanced NOx reduction." See Office Action at page 10, first paragraph. Applicant strenuously disagrees with this conclusion.

As Applicant has previously pointed out, the presently claimed invention is directed to "[a] method of reducing NO_x emission during fluid catalytic cracking of a hydrocarbon feedstock... comprising contacting a hydrocarbon feedstock with a cracking catalyst suitable... wherein said NO_x reduction composition comprises a (i) mixed oxide of cerium and zirconium..." See Claim 17 (emphasis added). In contrast, the '298 patent claims, "[a] method of reducing NO_x emission during fluid catalytic cracking of a hydrocarbon feedstock... wherein said NO_x reduction composition comprises... cerium oxide..." See Claim 1 of the '298 patent (emphasis added). The '298 patent does not teach or suggest the use of a mixed oxide of cerium and zirconium as a NOx reduction component.

Again, the catalyst art is very empirical. As one of skill in the art would appreciate there is simply no way of knowing how the addition of an additional component to the catalyst composition would affect the catalytic activity thereof. There is no indication whatsoever in the '298 patent that the addition of a mixed oxide of cerium and zirconium would work in the NOx reduction component taught therein.

As Applicant has pointed out hereinabove, Applicant's disclosure includes Examples, which show improved NOx reduction with a mixed oxide of cerium and zirconium over ceria and zirconia alone. Applicant respectfully directs the Examiner's attention to Table 1 of Applicant's disclosure, which shows that,

"Examples 1 and 4 through 7, within the scope of the present invention, wielded substantial NO uptake retention and surface area stability relative to Comparative Examples A and B." See Applicant's specification at page 11. Since the '298 patent does not disclose the use of a zirconium and cerium mixed oxide in NOx reduction, and since zirconium and cerium by themselves show no NOx reduction, absent Applicant's disclosure there would be no reason to expect success using the claimed combination for NOx reduction.

As such, Applicant respectfully asserts that the presently claimed invention is not obvious in light of the '298 patent, and therefore, that these two cases are directed to two distinct and separately patentable inventions. Reconsideration and withdrawal of this rejection is respectfully requested.

Respectfully submitted,

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Date

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